



Complete Summary

TITLE

Venous thromboembolism (VTE): percent of patients diagnosed with confirmed VTE who received an overlap of parenteral (intravenous or subcutaneous) anticoagulation and warfarin therapy.

SOURCE(S)

Specifications manual for national hospital inpatient quality measures, version 3.0b. Centers for Medicare & Medicaid Services (CMS), The Joint Commission; 2009 Oct. various p.

Measure Domain

PRIMARY MEASURE DOMAIN

Process

The validity of measures depends on how they are built. By examining the key building blocks of a measure, you can assess its validity for your purpose. For more information, visit the [Measure Validity](#) page.

SECONDARY MEASURE DOMAIN

Does not apply to this measure

Brief Abstract

DESCRIPTION

This measure* is used to assess the number of patients diagnosed with confirmed venous thromboembolism (VTE) who received an overlap of parenteral (intravenous [IV] or subcutaneous [subcu]) anticoagulation and warfarin therapy. For patients who received less than five days of overlap therapy, they must be discharged on both medications. Overlap therapy must be administered for at least five days with an international normalized ratio (INR) greater than or equal to 2 prior to discontinuation of the parenteral anticoagulation therapy or the patient must be discharged on both medications.

*This is a Joint Commission only measure.

RATIONALE

For patients who present with a confirmed acute venous thromboembolism (VTE), parenteral anticoagulation is the first line of therapy because of its rapid onset of action. Because the oral anticoagulant warfarin has a very slow onset of action, it cannot be used as mono-therapy for acute VTE. Pretreatment with parenteral anticoagulants prior to initiation of warfarin also avoids an early period of hypercoagulability that can result from the selective inhibition of proteins S and C (which have very short half lives). Warfarin can be initiated on the first day of treatment after the first dose of a parenteral anticoagulant has been given.

Warfarin interferes with the synthesis of vitamin K dependent pro-coagulant factors (factors II, VII, IX, and X) as well as some anticoagulant factors (proteins S and C). It takes several days for warfarin to achieve its effect because time is required for normal coagulation factors to be cleared from plasma. The adequacy of warfarin therapy is monitored by measurement of the international normalized ratio (INR). The INR can sometimes appear prolonged (or "therapeutic") as soon as 24 hours after the institution of warfarin due to a reduction in factor VII levels, even while factor II levels are still high and the patient is not in fact therapeutically anti-coagulated. Because factor II has a half-life of 60-72 hours, a minimum of five days of parenteral anticoagulation is recommended as "overlap therapy" while warfarin is being initiated. Parenteral therapy should also be continued until the INR is greater than or equal to 2.0, even if this takes longer than five days, so that patients are fully anticoagulated during the period before warfarin takes its full effect.

PRIMARY CLINICAL COMPONENT

Venous thromboembolism (VTE); overlap therapy (parenteral anticoagulation, warfarin therapy)

DENOMINATOR DESCRIPTION

Patients with confirmed venous thromboembolism (VTE) who received warfarin (see the related "Denominator Inclusions/Exclusions" field in the Complete Summary)

NUMERATOR DESCRIPTION

Patients who received overlap therapy (see the related "Numerator Inclusions/Exclusions" field in the Complete Summary)

Evidence Supporting the Measure

EVIDENCE SUPPORTING THE CRITERION OF QUALITY

- A clinical practice guideline or other peer-reviewed synthesis of the clinical evidence
- One or more research studies published in a National Library of Medicine (NLM) indexed, peer-reviewed journal

NATIONAL GUIDELINE CLEARINGHOUSE LINK

- [Antithrombotic therapy for venous thromboembolic disease. American College of Chest Physicians evidence-based clinical practice guidelines \(8th edition\).](#)

Evidence Supporting Need for the Measure

NEED FOR THE MEASURE

Use of this measure to improve performance
Variation in quality for the performance measured

EVIDENCE SUPPORTING NEED FOR THE MEASURE

Ansell J, Hirsh J, Hylek E, Jacobson A, Crowther M, Palareti G. Pharmacology and management of the vitamin K antagonists: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines (8th Edition). Chest 2008 Jun;133(6 Suppl):160S-98S. [419 references] [PubMed](#)

Buller HR, Davidson BL, Decousus H, Gallus A, Gent M, Piovella F, Prins MH, Raskob G, Segers AE, Cariou R, Leeuwenkamp O, Lensing AW, Matisse Investigators. Fondaparinux or enoxaparin for the initial treatment of symptomatic deep venous thrombosis: a randomized trial. Ann Intern Med 2004 Jun 1;140(11):867-73. [PubMed](#)

Buller HR, Davidson BL, Decousus H, Gallus A, Gent M, Piovella F, Prins MH, Raskob G, van den Berg-Segers AE, Cariou R, Leeuwenkamp O, Lensing AW, Matisse Investigators. Subcutaneous fondaparinux versus intravenous unfractionated heparin in the initial treatment of pulmonary embolism. N Engl J Med 2003 Oct 30;349(18):1695-702. [PubMed](#)

Caprini JA, Tapson VF, Hyers TM, Waldo AL, Wittkowsky AK, Friedman R, Colgan KJ, Shillington AC, NABOR Steering Committee. Treatment of venous thromboembolism: adherence to guidelines and impact of physician knowledge, attitudes, and beliefs. J Vasc Surg 2005 Oct;42(4):726-33. [PubMed](#)

Gallus A, Jackaman J, Tillett J, Mills W, Wycherley A. Safety and efficacy of warfarin started early after submassive venous thrombosis or pulmonary embolism. Lancet 1986 Dec 6;2(8519):1293-6. [PubMed](#)

Kearon C, Kahn SR, Agnelli G, Goldhaber S, Raskob GE, Comerota AJ. Antithrombotic therapy for venous thromboembolic disease: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines (8th Edition). Chest 2008 Jun;133(6 Suppl):454S-545S. [393 references] [PubMed](#)

Sallah S, Thomas DP, Roberts HR. Warfarin and heparin-induced skin necrosis and the purple toe syndrome: infrequent complications of anticoagulant treatment. Thromb Haemost 1997 Aug;78(2):785-90. [96 references] [PubMed](#)

State of Use of the Measure

STATE OF USE

Current routine use

CURRENT USE

Accreditation
Collaborative inter-organizational quality improvement
Internal quality improvement

Application of Measure in its Current Use

CARE SETTING

Hospitals

PROFESSIONALS RESPONSIBLE FOR HEALTH CARE

Measure is not provider specific

LOWEST LEVEL OF HEALTH CARE DELIVERY ADDRESSED

Single Health Care Delivery Organizations

TARGET POPULATION AGE

Age greater than or equal to 18 years

TARGET POPULATION GENDER

Either male or female

STRATIFICATION BY VULNERABLE POPULATIONS

Unspecified

Characteristics of the Primary Clinical Component

INCIDENCE/PREVALENCE

The incidence of deep vein thrombosis (DVT) varies with the population studied and ranges from 56 cases/100,000 to 182 cases/100,000 patients.

Inconsistent practice regarding discontinuation of the use of unfractionated heparin (UFH) or low-molecular-weight heparin (LMWH) was noted in a study of 38 US hospitals. Only 50.6% (246) of the 486 patients that received overlap therapy had an international normalized ratio (INR) of at least 2 for two consecutive days before discontinuation of the parenteral agent. According to the National Anticoagulation Benchmark and Outcomes Report (NABOR), 61% without a therapeutic INR were discharged on overlap therapy.

EVIDENCE FOR INCIDENCE/PREVALENCE

Anderson FA Jr, Wheeler HB, Goldberg RJ, Hosmer DW, Patwardhan NA, Jovanovic B, Forcier A, Dalen JE. A population-based perspective of the hospital incidence and case-fatality rates of deep vein thrombosis and pulmonary embolism. The Worcester DVT Study. Arch Intern Med 1991 May;151(5):933-8. [PubMed](#)

Goldhaber SZ, Tapson VF, DVT FREE Steering Committee. A prospective registry of 5,451 patients with ultrasound-confirmed deep vein thrombosis. Am J Cardiol 2004 Jan 15;93(2):259-62. [PubMed](#)

Risk of and prophylaxis for venous thromboembolism in hospital patients. Thromboembolic Risk Factors (THRIFT) Consensus Group. BMJ 1992 Sep 5;305(6853):567-74. [108 references] [PubMed](#)

Tapson VF, Hyers TM, Waldo AL, Ballard DJ, Becker RC, Caprini JA, Khetan R, Wittkowsky AK, Colgan KJ, Shillington AC, NABOR (National Anticoagulation Benchmark and Outcomes Report) Steering Committee. Antithrombotic therapy practices in US hospitals in an era of practice guidelines. Arch Intern Med 2005 Jul 11;165(13):1458-64. [PubMed](#)

ASSOCIATION WITH VULNERABLE POPULATIONS

In the deep vein thrombosis (DVT) FREE study that represented 183 sites, elderly hospitalized patients, patients with recent surgery, cancer, or previous DVT were most susceptible to DVT. In addition, there is considerable variation in individual anticoagulant responses to unfractionated heparin (UFH). In the Nurses' Health Study, obesity was associated with a three-fold increase in the likelihood of developing pulmonary embolism (PE).

EVIDENCE FOR ASSOCIATION WITH VULNERABLE POPULATIONS

Goldhaber SZ, Grodstein F, Stampfer MJ, Manson JE, Colditz GA, Speizer FE, Willett WC, Hennekens CH. A prospective study of risk factors for pulmonary embolism in women. JAMA 1997 Feb 26;277(8):642-5. [PubMed](#)

Goldhaber SZ, Tapson VF, DVT FREE Steering Committee. A prospective registry of 5,451 patients with ultrasound-confirmed deep vein thrombosis. Am J Cardiol 2004 Jan 15;93(2):259-62. [PubMed](#)

BURDEN OF ILLNESS

Unspecified

UTILIZATION

Venous thromboembolism (VTE) is a major national health problem that continues to take a tremendous toll on lives and creates major disabilities. Annually between 300,000 and 600,000 hospitalizations are associated with VTE, and deep vein thrombosis (DVT) causes an estimated five to ten percent of all deaths as a result of pulmonary embolism (PE).

EVIDENCE FOR UTILIZATION

Anderson FA Jr, Wheeler HB, Goldberg RJ, Hosmer DW, Patwardhan NA, Jovanovic B, Forcier A, Dalen JE. A population-based perspective of the hospital incidence and case-fatality rates of deep vein thrombosis and pulmonary embolism. The Worcester DVT Study. Arch Intern Med 1991 May;151(5):933-8. [PubMed](#)

Hull RD, Feldstein W, Stein PD, Pineo GF. Cost-effectiveness of pulmonary embolism diagnosis. Arch Intern Med 1996 Jan 8;156(1):68-72. [PubMed](#)

Risk of and prophylaxis for venous thromboembolism in hospital patients. Thromboembolic Risk Factors (THRIFT) Consensus Group. BMJ 1992 Sep 5;305(6853):567-74. [108 references] [PubMed](#)

COSTS

Associated costs of treating the associated morbidity and mortality of a deep vein thrombosis (DVT) are estimated between \$3.2- \$15.5 billion (1992 dollars) per year.

EVIDENCE FOR COSTS

Hull RD, Feldstein W, Stein PD, Pineo GF. Cost-effectiveness of pulmonary embolism diagnosis. Arch Intern Med 1996 Jan 8;156(1):68-72. [PubMed](#)

Institute of Medicine National Healthcare Quality Report Categories

IOM CARE NEED

Getting Better

IOM DOMAIN

Effectiveness
Safety

Data Collection for the Measure

CASE FINDING

Users of care only

DESCRIPTION OF CASE FINDING

Patients, age 18 years and older, with confirmed venous thromboembolism (VTE) who received warfarin (see the "Denominator Inclusions/Exclusions" field)

DENOMINATOR SAMPLING FRAME

Patients associated with provider

DENOMINATOR INCLUSIONS/EXCLUSIONS

Inclusions

Patients with confirmed venous thromboembolism (VTE) who received warfarin

Include discharges with an *International Classification of Disease, Ninth Revision, Clinical Modification (ICD-9-CM) Principal or Other Diagnosis Codes* of VTE as defined in Appendix A, Table 7.03 or 7.04 of the original measure documentation

Exclusions

- Patients less than 18 years of age
- Patients who have a length of stay (LOS) greater than 120 days
- Patients with *Comfort Measures Only* documented
- Patients enrolled in clinical trials
- Patients without warfarin therapy during hospitalization
- Patients without warfarin prescribed at discharge
- Patients without VTE confirmed by diagnostic testing

RELATIONSHIP OF DENOMINATOR TO NUMERATOR

All cases in the denominator are equally eligible to appear in the numerator

DENOMINATOR (INDEX) EVENT

Clinical Condition
Institutionalization
Therapeutic Intervention

DENOMINATOR TIME WINDOW

Time window brackets index event

NUMERATOR INCLUSIONS/EXCLUSIONS

Inclusions

Patients who received overlap therapy (warfarin **and** parenteral anticoagulation):

- Five or more days, with an international normalized ratio (INR) greater than or equal to 2 prior to discontinuation of parenteral therapy OR
- Five or more days, with an INR less than 2 and discharged on overlap therapy OR Less than five days and discharged on overlap therapy OR
- Less than five days and discharged on overlap therapy

Exclusions

None

MEASURE RESULTS UNDER CONTROL OF HEALTH CARE PROFESSIONALS, ORGANIZATIONS AND/OR POLICYMAKERS

The measure results are somewhat or substantially under the control of the health care professionals, organizations and/or policymakers to whom the measure applies.

NUMERATOR TIME WINDOW

Institutionalization

DATA SOURCE

Administrative data
Medical record

LEVEL OF DETERMINATION OF QUALITY

Individual Case

PRE-EXISTING INSTRUMENT USED

Unspecified

Computation of the Measure

SCORING

Rate

INTERPRETATION OF SCORE

Better quality is associated with a higher score

ALLOWANCE FOR PATIENT FACTORS

Unspecified

STANDARD OF COMPARISON

External comparison at a point in time
External comparison of time trends
Internal time comparison

Evaluation of Measure Properties

EXTENT OF MEASURE TESTING

This measure has undergone a rigorous process of public comment and two phases (alpha and pilot [beta]) of testing that included reliability testing. The pilot specifications and algorithms were tested at over 40 hospitals (5,713 cases) for six months during 2007.

EVIDENCE FOR RELIABILITY/VALIDITY TESTING

Information about the Candidate Voluntary Consensus Standards for Hospital Care, additional priorities, 2007, detailed performance measure evaluation [unpublished].

Identifying Information

ORIGINAL TITLE

VTE-3: Venous thromboembolism patients with anticoagulation overlap therapy.

MEASURE COLLECTION

[National Hospital Inpatient Quality Measures](#)

MEASURE SET NAME

[Venous Thromboembolism \(VTE\)](#)

SUBMITTER

Centers for Medicare & Medicaid Services
Joint Commission, The

DEVELOPER

Centers for Medicare & Medicaid Services/The Joint Commission

FUNDING SOURCE(S)

All external funding for measure development has been received and used in full compliance with The Joint Commission's Corporate Sponsorship policies, which are available upon written request to The Joint Commission.

COMPOSITION OF THE GROUP THAT DEVELOPED THE MEASURE

Technical advisory panel of stakeholders. The list of participants is available at <http://www.jointcommission.org/NR/rdonlyres/1A4DF024-92D7-42D0-B997-348193843D89/0/VTETechnicalAdvisoryPanel.pdf>.

FINANCIAL DISCLOSURES/OTHER POTENTIAL CONFLICTS OF INTEREST

Expert panel members have made full disclosure of relevant financial and conflict of interest information in accordance with the Joint Commission's Conflict of Interest policies, copies of which are available upon written request to The Joint Commission.

ENDORSER

National Quality Forum

ADAPTATION

Measure was not adapted from another source.

RELEASE DATE

2009 Oct

MEASURE STATUS

This is the current release of the measure.

SOURCE(S)

Specifications manual for national hospital inpatient quality measures, version 3.0b. Centers for Medicare & Medicaid Services (CMS), The Joint Commission; 2009 Oct. various p.

MEASURE AVAILABILITY

The individual measure, "VTE-3: Venous Thromboembolism Patients with Anticoagulation Overlap Therapy," is published in "Specifications Manual for National Hospital Inpatient Quality Measures." This document is available from [The Joint Commission Web site](#). Information is also available from the [Centers for Medicare & Medicaid Services \(CMS\) Web site](#). Check The Joint Commission Web site and CMS Web site regularly for the most recent version of the specifications manual and for the applicable dates of discharge.

NQMC STATUS

The Joint Commission submitted this NQMC measure summary to ECRI Institute on September 18, 2009. This NQMC summary was reviewed accordingly by ECRI Institute on November 10, 2009.

COPYRIGHT STATEMENT

The Specifications Manual for National Hospital Inpatient Quality Measures [Version 3.0b, October, 2009] is the collaborative work of the Centers for Medicare & Medicaid Services and The Joint Commission. The Specifications Manual is periodically updated by the Centers for Medicare & Medicaid Services and The Joint Commission. Users of the Specifications Manual for National

Hospital Inpatient Quality Measures should periodically verify that the most up-to-date version is being utilized.

[Copyright/Permission Requests](#)

Date Modified: 1/4/2010

